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Does Parental Disability Matter to Child Education?

Evidence from Vietnam

Nguyen Viet Cuong
Daniel Mont

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Abstract

This paper examines the effect of parental disability on school enrollment and educational performance for children in the 2006 Vietnam Household Living Standards Survey. Results from instrumental-variables regressions indicate that children of parents with a disability have a lower enrollment rate in primary and secondary school of about 8 percentage points: 73 percent compared with 81 percent. However, the association of parental disability with educational performance is small and not statistically significant. The conclusion of the paper is that to achieve the Millennium Development Goal of universal primary school as well as increased coverage of secondary education, the government should have policies and programs that either directly support the education of children with disabled parents and/or have policies that support disabled adults, thus lessening the incentive for their children not to attend school.

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Nguyen Viet Cuong

National Economics University, Hanoi

Daniel Mont

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1. Introduction

Child education is of fundamental importance to all governments, as shown by the inclusion of universal primary school enrollment as one of the Millennium Development Goals. Thus educational economics has long investigated the determinants of child education (e.g. see Becker, 1965; Becker and Tomes, 1976; Leibowitz, 1974; Tansel, 1997, Black et al., 2005).

Sometimes investment in childhood education loses out to the use of child labor. In developing countries, when families are faced with poverty they often turn to their children to provide additional income (Basu and Van, 1998, Swinnerton and Rogers, 1999, Grootaert and Kanbur, 1995) and so make the decision to forego their children's education explicitly to generate more current household income (Edmonds, 2003; Edmonds and Turk, 2004; Beegle, Dehejia, and Gatti, 2005).

Other parental characteristics, apart from income, also influence children's enrollment. For example, there is a clear correlation between high levels of education in parents and the enrollment and achievements of their children (e.g., Behrman et al., 1999; Glick and Sahn, 2000).

Childhood characteristics also matter. For example, historically girls have been less likely to attend school than boys (World Bank, 2001), although this gap has been closing (United Nations 2008). Another factor that can limit children's education is the presence of a disability. In fact, Filmer (2008) found that childhood disability was a better predictor of school enrollment than gender and other socio-economic characteristics. Evidence in Vietnam also points towards lower enrollment in school for people with disabilities (Mont and Cuong, 2011).

Yet, little is known about the effect of parental disability on child education. Parental disability could potentially be associated with poor education outcomes among children for a few reasons. Disability can result in lower labor productivity and less income. Some evidence suggests a strong association with poverty (Braithwaite and Mont 2009, Hoogeveen 2005, Yeo and Moore 2003), primarily through the effect on employment (Mitra and Sambamoorthi 2008, Contreras et al. 2006, Eide and Loeb 2006,

Eide and Kamaleri 2009, Mete 2008, Trani and Loeb 2010). Therefore, children who have disabled parents might have to work for income, undertake household production typically done by parents, and even possibly care for their parent. These extra demands on their time could lead to less time spent on education.

Moreover, disability can decrease parents' involvement in their children's education because of the increased costs and demands on their time (Zaidi and Burchardt 2005). Child education depends crucially on the extent parents can get involved with their children in learning activities at home (e.g. Williams and Chavkin, 1989; Greenwood and Hickman, 1991; Trusty, 1996; Desforges, 2003). Disabled parents may be less able to supervise their children's educational activities because of various barriers in society - for example lack of accessible transportation to visit schools and teachers, or lack of training in sign language or Braille which limits their communication skills. If a parent has significant cognitive disabilities, that may also limit their ability to assist their children in learning. However, once education and income are controlled for, it is not clear whether parental disability can have negative impacts on child education, since parents with disabilities who have managed to obtain high levels of education and earnings have shown evidence of overcoming the barriers disabled people may face in their societies.

In this paper, we will examine the extent to which the disability status of parents can affect the school enrollment and educational performance of children aged from 6 to 17 years old (age of primary and secondary school) in Vietnam. Around the world many more children are attending primary school, but as countries approach universal primary education, the remaining out of school students often have particular challenges that are not easily addressed by standard policies aimed to boost enrollment. Parental disability – at least in Vietnam – appears to be one of these factors.

For several reasons, Vietnam is an interesting case. First, there have been no studies on the relation between parents' health, especially parental disability, and child education in Vietnam. Vietnam has implemented a large number of policies to promote education, especially primary and lower secondary education. Findings from this study can also provide helpful information for improving these policies on educational support. Currently, supports on education are provided mainly for the poor and ethnic minorities in Vietnam. If parental disability can have negative impacts on child education, then

maybe children whose parents are disabled should also receive educational supports or their families should receive supports and the creation of a more inclusive environment that eases their participation in society. Presumably, that would make education a more attractive choice for their children. Second, the Vietnam Household Living Standards Survey, which was conducted in 2006, has a special module on disability. Detailed data on disability allow for the analysis of the relation between disability and education. Third, Vietnam has a similar education system and economic development as many Asian countries, such as Thailand, Philippines, Indonesia, Laos, and Cambodia. Findings from this study might be relevant to not only Vietnam but also to other Asian developing countries.

The remainder of this paper is organized as follows. Section 2 introduces the data sources used in this study. Section 3 provides some descriptive data on disability and child education in Vietnam. Section 4 presents estimation of the impact of parental disability on child education. Finally, Section 5 concludes.

2. Data source

Data used in this study are from the Vietnam Living Standards Survey (VHLSS) in 2006. The 2006 VHLSS was conducted by the General Statistics Office of Vietnam (GSO) with technical support from World Bank. The survey contains detailed information on the characteristics of individuals, households and communes.

Individual and household data include basic demographics, employment and labor force participation, education, health, income, expenditure, housing, fixed assets and durable goods, and the participation of households in socioeconomic programs. VHLSSs have been collected every two years since 2002, meaning there are four available VHLSSs from 2002 to 2010. However, unlike other VHLSSs, the 2006 VHLSS contains two special modules on education and disability. Information on education of individuals includes educational attainment and educational records in the schooling year 2005-2006 in primary, secondary and high schools. Information on disability includes types and reasons of different disabilities such as difficulty in hearing, seeing, walking, etc.

The commune questionnaires collect information on commune characteristics that affect the local living standards such as infrastructure, demography, and socioeconomic conditions. Commune data can be linked to household and individual data, but are only available in rural areas.

The 2006 VHLSS covers 9,189 households. The number of individuals in the survey is 39,071. This sample is representative for rural and urban areas, and all eight geographical regions.

3. Parental disability and child education in Vietnam

One of the difficulties in analyzing disability is in definition and measurement. In this paper, we follow the approach of the UN Statistical Commission's Washington Group on Disability Statistics (Washington Group, 2009), which relies on the functional model of disability underlying the International Classification of Functioning, Disability and Health (WHO, 2009). Incorporated in this approach is the social model of disability, which conceives of disability as emerging from the interaction of functional limitations with barriers in the environment. That is a person is disabled – that is, not capable of fully participating in various aspects of society – if they have difficulties in functioning that are not accommodated for in the environment – where environment is interpreted broadly as including the physical, cultural, and policy environments.

Identifying disability in this way is quite complex. For the purposes of this paper – and following the Washington Group recommendations for assessing the impact of disability on equal opportunity – this paper uses the presence of difficulties in basic activities including seeing, hearing, walking, cognition, communication, and self-care as an operational proxy of functional limitation that puts him or her at risk of being disabled in the social model sense (Mont, 2007). Following Loeb, Eide, and Mont (2008), we will define a person to be disabled if she or he has a little difficulty in at least two of the

functional domains (seeing, hearing, walking, cognition, communication, and self-care), or a lot of difficulty in (or unable to do) one or more of the domains.[1]

The 2006 VHLSS shows that the fraction of pupils aged from 6 to 17 who have at least a mother or a father with disabilities is around 5.8 percent (Table 1). Older children are more likely to have parents with disabilities. This is because older children tend to have older parents and people are more likely to become disabled as they get older. Table 1 also shows there is a negative correlation between disability and household welfare. People who have higher education and consumption are less likely to have disabilities.

Table 1 also presents the schooling rate of children with parents having a disability and children with parents not having disability. There is a large difference in the schooling rate between these two groups of children. Children with disabled parents have a lower school enrollment rate (73.1 percent) than other children (85.6 percent).

Interestingly, girls have a higher proportion of education enrollment than boys. Among children whose parents have disabilities, the schooling proportion for girl was 77.5 percent, which is much higher than the proportion of 68.4 percent for boys.

The gap in education between children with and without a disabled parent is largest for children aged from 15 to 17, which is the age for upper-secondary school. This gap in education tends to be larger for disadvantaged groups such as rural children, ethnic minority children, children living with a household head of low education degree, and poor children. For example, in the lowest expenditure quintiles, children whose parents have disabilities have an enrollment rate 14 percentage points lower than children whose parents do not have disabilities.

Among children in school, those with disabled parents also have worse educational performance. However, this difference is not very large. Table 2 shows that the fraction of pupils achieving excellent academic performance in the last school year is 14 percent for children without disabled parents, while this figure is around 11 percent for

[1] In the 2006 VHLSS, people are asked about their difficulties in different functions including seeing, hearing, walking, cognition, communication, and self-care, and their responses are classified into 4 categories:

a. No - no difficulty
b. Yes – some difficulty
c. Yes – a lot of difficulty
d. Cannot do at all.

children whose parents have a disability. The table also shows a strong relation between children's educational performance with other household characteristics. As expected, children in better-off households such as urban, Kinh (the ethnic majority whom all are native Vietnamese speakers), and households with high income and education are more likely to have better academic performance.

Table 1. Proportion of children with parents with disability and proportion of schooling children

Groups	Proportion of children with parents with disability (%)	Schooling rate of children by disability of their parents (%)		
		Parents without disability	Parents with disability	Total
Total	5.64	85.59	73.11	84.88
Gender				
Girls	5.84	86.93	77.49	86.38
Boys	5.46	84.31	68.42	83.44
Age				
Age 6-10	3.21	95.72	91.94	95.60
Age 11-14	6.00	91.82	82.85	91.28
Age 15-17	7.37	69.10	56.66	68.19
Ethnic minorities				
Kinh	5.17	86.69	75.12	86.09
Ethnic minorities	8.00	79.98	66.26	78.88
Rural/Urban				
Rural	5.67	84.44	70.61	83.65
Urban	5.55	89.95	82.29	89.52
Regions				
Red River Delta	4.42	90.23	83.70	89.94
North East	6.98	90.71	70.50	89.30
North West	3.37	81.48	81.21	81.47
North Central Coast	4.21	86.79	79.50	86.48
South Central Coast	4.44	88.26	90.59	88.36
Central Highlands	8.18	86.79	69.55	85.38
South East	7.18	83.66	73.97	82.96
Mekong River Delta	5.97	76.06	55.29	74.82
Education of household head				
No degree	9.65	72.57	58.85	71.24
Primary school degree	5.23	83.73	68.10	82.91
Lower-secondary school degree	4.19	89.14	85.33	88.98
Upper-secondary school degree	4.43	93.63	96.99	93.78
Post secondary degree	4.19	96.62	94.52	96.53

Groups	Proportion of children with parents with disability (%)	Schooling rate of children by disability of their parents (%)		
		Parents without disability	Parents with disability	Total
Consumption quintiles				
Poorest	7.12	78.15	63.94	77.13
Near poorest	5.66	84.45	74.25	83.88
Middle	4.65	87.58	71.48	86.83
Near richest	4.91	89.35	78.88	88.84
Richest	5.34	93.23	88.18	92.96
Number of observations	8,790	507	8,283	8,790

Source: Estimation from the 2006 VHLSS

Table 2. Proportion of schooled children by their educational performance

Groups	Children with parents without disability				Parents with disability			
	Excellent	Good	Middle, Bad	Total	Excellent	Good	Middle, Bad	Total
Total	14.01	37.29	48.7	100	11.02	39.82	49.16	100
Gender								
Girls	17.03	40.51	42.46	100	13.27	49.22	37.51	100
Boys	11.04	34.11	54.85	100	8.38	28.86	62.76	100
Age								
Age 6-10	20.85	35.71	43.44	100	12.05	41.47	46.48	100
Age 11-14	12.27	39.31	48.42	100	11.13	38.61	50.26	100
Age 15-17	8.53	36.03	55.44	100	10.27	40.56	49.17	100
Ethnic minorities								
Kinh	15.89	40.15	43.96	100	13.31	46.62	40.07	100
Ethnic minorities	3.5	21.27	75.23	100	2.77	15.45	81.78	100
Rural/Urban								
Rural	10.88	35.75	53.37	100	6.09	38.63	55.28	100
Urban	25.15	42.76	32.09	100	27.53	43.81	28.66	100
Regions								
Red River Delta	15.41	46.35	38.24	100	6.76	50.3	42.94	100
North East	8.98	37.85	53.17	100	7.8	18.01	74.18	100
North West	5.92	19.53	74.55	100	0	21.27	78.73	100
North Central Coast	7.83	37.42	54.75	100	6.64	51.06	42.3	100
South Central Coast	19.98	30.85	49.17	100	6.01	31.86	62.13	100
Central Highlands	10.62	28.29	61.09	100	7.91	43.68	48.41	100
South East	22.21	38.59	39.2	100	24.03	37.17	38.8	100
Mekong River Delta	15.41	36.69	47.9	100	14.74	47.32	37.94	100
Education of household head								
No degree	4.95	27.52	67.53	100	4.29	30.78	64.93	100
Primary school degree	11.58	34.02	54.41	100	10.86	41.11	48.02	100
Lower-secondary school degree	11.59	40.39	48.03	100	9.26	43.75	46.99	100

Upper-secondary school degree	18.03	44.39	37.58	100	27.37	53.71	18.92	100
Post secondary degree	33.71	43.56	22.73	100	18.37	38.19	43.44	100
Consumption quintiles								
Poorest	4.87	26.51	68.62	100	4.11	34.12	61.77	100
Near poorest	8.26	37.48	54.27	100	6.81	40.01	53.17	100
Middle	13.2	39.79	47.01	100	9.19	32.97	57.84	100
Near richest	18.32	43.51	38.17	100	12.13	50.35	37.52	100
Richest	32.85	41.88	25.27	100	30.96	45.95	23.09	100
Number of observations	34	141	205	380	924	2,471	3,650	7,045

Source: Estimation from the 2006 VHLSS

4. Impacts of parental disability on child education

4.1. Estimation method

To measure the impact of disability of parents on child education, we assume the follow function:

$$P(Y = j \mid X, D) = G(\alpha + X\beta + D\gamma), \qquad (1)$$

where Y is an indicator of educational performance of children, D is the dummy indicating the disability of parents of the children, and X is a vector of control variables including individual and household characteristics which can affect educational performance. In this paper we use two education indicators. The first is school enrollment, which is equal 1 for children attending school, and 0 otherwise. The second is their academic record, which is equal to 1, 2 and 3 for 'excellent' record, 'good' record and 'normal and bad' record, respectively.[2]

When the dependent variable is school enrollment, we will use a probit model to estimate equation (1). A problem in non-linear functions is that the meaning of the coefficients is not clear. Thus to estimate the impact of parental disability on school

[2] As mentioned, we combine pupils with the 'bad' record and pupils with the 'normal' record, since there are only around 1 percent of pupils having the 'bad' record.

enrollment, we use the Average Treatment Effect on the Treated, which is the most popular parameter in the impact evaluation literature (Heckman et al., 1999). This parameter is expressed as follows:

$$ATT = E\left(Y_{(D=1)} \mid D=1\right) - E\left(Y_{(D=0)} \mid D=1\right), \quad (2)$$

where $E\left(Y_{(D=0)} \mid D=1\right)$ is the expected value of educational variables of children whose parents have a disability had there not been a disability. This is not observed and has to be estimated. Once equation (1) is estimated, ATT can be computed as follows:

$$\hat{ATT} = \frac{1}{n_D}\sum_{i=1}^{n_D}\left[\Phi\left(\hat{\alpha} + X_i\hat{\beta} + \hat{\gamma}\right) - \Phi\left(\hat{\alpha} + X_i\hat{\beta}\right)\right], \quad (3)$$

where n_D is the number of children whose parents have a disability, and Φ is the cumulative distribution function of the standard normal distribution (since we use a probit model).[3] Since the probit function is non-linear, and $\hat{ATT}$ estimated by (3) can vary slightly across *X*. We can allow the effect of parental disability to vary more remarkably across *X* by including interactions between *D* and *X*. The equation (1) becomes:

$$P\left(Y = j \mid X, D\right) = G\left(\alpha + X\beta + D\gamma + XD\theta\right). \quad (4)$$

The ATT is estimated by:

$$\hat{ATT} = \frac{1}{n_D}\sum_{i=1}^{n_D}\left[G\left(\hat{\alpha} + X_i\hat{\beta} + \hat{\gamma} + X_i\hat{\theta}\right) - G\left(\hat{\alpha} + X_i\hat{\beta}\right)\right]. \quad (5)$$

ATT can be estimated for children who have the value of the *X* variables equal to *x*:

$$\hat{ATT}_{X=x} = \frac{1}{n_{D,X=x}}\sum_{i=1}^{n_{D,X=x}}\left[G\left(\hat{\alpha} + x_i\hat{\beta} + \hat{\gamma} + x_i\hat{\theta}\right) - G\left(\hat{\alpha} + x_i\hat{\beta}\right)\right] \quad (6)$$

Where $n_{D,X=x}$ is the number of children who have parents with disabilities and the value of the *X* variables equal to *x*.

[3] We estimate the standard error of the ATT estimates by using a non-parametric bootstrap technique. More specifically, we repeatedly draw random samples from the original VHLSS 2006. Since the VHLSSs sample selection follows stratified random cluster sampling, communes instead of households are bootstrapped in each stratum (Deaton, 1997). The number of replications is 1000.

An important issue in estimating the effect of disability of parents on child education is the endogeneity of parental disability. There can be unobserved variables which affect both disability of parents and child education. When randomization is not possible, instrumental variables regression is the traditional way to deal with endogeneity. Finding a convincing instrument when both outcome and intervention (disability and education in this case) are indicators of individual welfare is challenging. In this study, we use the age of father as an instrument for parental disability. For children who do not live with a father, mother's age is used instead. We expect that age of parent is strongly correlated with their disability (Mont and Cuong 2011), but not correlated with child education given that the model controls for important factors affecting child education such as demography of children, education and income of parents. The second instrument is the proportion of people with disabilities within a district.[4] This proportion reflects the risky level in the district. It can strongly affect the probability of being disabled of an individual within district but would not affect the school enrollment of children. This so-called internal instrumental variable is also used in empirical studies such studies on the effect of migration (e.g., Mansuri, 2006; Acosta, 2006). The migration network is often used as the instrument for the probability of migration of a household or individual.

When the dependent variable is the academic record of children in school with the three mutually exclusive choices of 'excellent', 'good' and 'normal and bad', we will use an ordered probit regression. A problem is that there are no available models of ordered probit (as well as other multiple responses models such as ordered logit, multinomial logit or probit) with instrumental variables. In this study, we follow a control function approach. As noted in Wooldridge (2007), we can estimate an ordered probit with instrumental variables regression using a two-step approach. In the first step, we regress disability on explanatory variables and instruments, and predict residuals for all the observations. In the second step, we estimate the effect of parental disability consistently using an ordered probit model with the dependent variable of children's academic record and independent variables including parental disability, explanatory variables and predicted residuals from the first step.

[4] For each household, we calculate the proportion of disabled people within the district of residence, excluding the household itself. The average number of sampled households per district in the VHLSSs is 15.

4.2. Estimation results

Impacts on school enrollment

The regressions of children's school enrollment on parental disability are reported in Table A.3. Following studies on child education, the control variables (variables X) are education of parents, household income, age and sex of children, and geographic variables (e.g., Black et al., 2005; Lee, 2008). It should be noted that parents are labeled as household head and head's spouse to indicate the role of household head. The summary statistics of control variables are reported in Table A.1 in the Appendix.

To examine the sensitivity of the estimates to model specifications, we compare three different models, which mostly vary in the number of explanatory variables. Model 1 includes only exogenous variables, and Model 2 adds household heads' education. Model 3 also includes per capita income. It should be noted that parents' education and household income can be affected by disability, thus they should not be included in the model (Heckman et al., 1999). However, since these variables are important factors for education of children, we examine whether the estimates of the impact of parental disability are sensitive to these variables. For each model, we estimate using both probit and probit with instrumental variables regressions.

Table A.2 presents the first-stage regression of parental disability. It shows that both age of father and proportion of disability strongly increase the probability of parental disability. We perform a Cragg-Donald weak identification test of the instruments, and the statistic is extremely high, indicating that the instruments are strong.[5] Very strong instruments are expected to reduce the bias caused by invalid instruments. We can also perform the test of valid instruments by an overidentification test which is reported in Table A.3. It shows that for the three models, we are not able to reject the null hypothesis of valid instruments at the 5% significant level. However, the test on endogeneity of

[5] As a rule of thumb, if a test is under 10, the instruments might be weak (Staiger and Stock 1997).

parental disability does not reject the exogeneity of parental disability in the child education equation.

Table 3 presents the estimate of ATT of parental disability. The estimates are quite similar in the three models. The effect of parental disability on children's education enrollment is negative and statistically significant at the 5% significant level in all the models. The point estimates are also quite similar between different models. According to Model 1 in Probit with IV regressions, parental disability reduces child schooling rate by around 8.1 percentage points from 81.3 percent to 73.2 percent. This means children whose parents have a disability have a school enrollment rate of 73.2 percent, but if their parents had not been disabled, their schooling rate would have been around 81.3 percent.

It should be noted that adding education and income of households (Model 2 and 3, both with and without instruments) leads to a smaller estimate of the effect of parental disability. This implies that education of parents and income can be channels through which disability can affect children's education. Put differently, disability can lead to lower education and lower income, thereby lower education for their children.

Table 3: The impact of parental disability on child schooling rate

	Probit regressions			Probit with IV regressions		
	Y_1	Y_0	$ATT=Y_1-Y_0$	Y_1	Y_0	$ATT=Y_1-Y_0$
Model 1	0.732***	0.811***	-0.081***	0.732***	0.813***	-0.081***
	(0.025)	(0.010)	(0.024)	(0.024)	(0.011)	(0.024)
Model 2	0.732***	0.788***	-0.056***	0.732***	0.793***	-0.061***
	(0.024)	(0.012)	(0.022)	(0.024)	(0.013)	(0.023)
Model 3	0.732***	0.786***	-0.054**	0.732***	0.793***	-0.061***
	(0.024)	(0.012)	(0.021)	(0.024)	(0.013)	(0.022)

Note: Y_1 is the observed schooling rate of children whose parents have disabilities. Y_0 is the counterfactual schooling rate that children would have if their parent not been disabled. $ATT=Y_1-Y_0$ is the effect of parental disability on children's schooling rate.

* significant at 10%; ** significant at 5%; *** significant at 1%

Figures in parentheses are standard errors. Standard errors are corrected for sampling weights and estimated using bootstrap (non-parametric) with 500 replications.

Source: Estimation from the 2006 VHLSS.

We estimated a probit with instrumental variables regression including interactions between parental disability and different characteristics of children including gender, urbanity, ethnicity and age. The instrumental variables for the interactions are the interactions between these interacted characteristics and the instruments for parental

disability (i.e., age of father and the district proportion of disabled people). The probit regressions are reported in Table A.4 in the Appendix.

Table 4 presents the estimate of ATT for different child groups. We are not able to reject the equality of the impact estimates between different groups. However, Table 4 shows some interesting findings. The point estimate shows a stronger (negative) effect of parental disability on boys than on girls, given that culturally females are more likely to care for people in need, this may suggest that the main driver for lower enrollment may be resulting more from the need to undertake livelihood production to account for the extra costs associated with disability. This is also consistent with the finding that the biggest impact on enrollment is for children aged 15 to 17.

These results are also consistent with the descriptive data presented in Table 1, in which there is a large gap in the schooling rate between girls and boys in households with parental disability. The adverse effect of parental disability on child education is found larger in urban areas and Kinh children.

Table 4: The impact of parental disability on child schooling rate for different groups

Model specification	Groups	Y1	Y0	ATT
Model including interaction between child gender and disability of parents	All	0.731***	0.816***	-0.086***
		(0.024)	(0.011)	(0.023)
	Boy	0.684***	0.810***	-0.126***
		(0.032)	(0.014)	(0.030)
	Girl	0.776***	0.822***	-0.047
		(0.030)	(0.014)	(0.030)
Model including interaction between urbanity and disability of parents	All	0.731***	0.818***	-0.087***
		(0.024)	(0.011)	(0.023)
	Urban	0.823***	0.870***	-0.046
		(0.048)	(0.021)	(0.051)
	Rural	0.708***	0.805***	-0.096***
		(0.027)	(0.013)	(0.026)
Model including interaction between ethnic minority of children and disability of parents	All	0.731***	0.817***	-0.087***
		(0.024)	(0.011)	(0.024)
	Ethnic minorities	0.662***	0.713***	-0.051
		(0.049)	(0.028)	(0.051)
	Kinh	0.750***	0.850***	-0.101***
		(0.026)	(0.011)	(0.026)
Model including interaction between children's age and disability of parents	All	0.731***	0.822***	-0.091***
		(0.024)	(0.011)	(0.023)
	Aged 6-10	0.920***	0.945***	-0.024

	(0.032)	(0.010)	(0.032)
Aged 11-14	0.829***	0.856***	-0.028
	(0.031)	(0.011)	(0.030)
Aged 15-17	0.569***	0.743***	-0.174***
	(0.039)	(0.016)	(0.037)

Note: Y_1 is the observed schooling rate of children whose parents have disabilities. Y_0 is the counterfactual schooling rate, that is their enrollment if their parent had not been disabled. $ATT=Y_1-Y_0$ is the effect of parental disability on children's schooling rate.

* significant at 10%; ** significant at 5%; *** significant at 1%

Figures in parentheses are standard errors. Standard errors are corrected for sampling weights and estimated using bootstrap (non-parametric) with 500 replications.

Source: Estimation from the 2006 VHLSS.

Table A.5 in the Appendix presents the ordered probit regressions of academic records. We tried both ordered logit with and without instruments for parental disability. Estimates of the parental variables are very small and not statistically significant in all the regressions. This means that once attending school, children with disabled parents do not have worse educational performance than children with non-disabled parents given that the estimation procedure controls for other observed characteristics.

Finally, the regressions of school enrollment and academic records show some interesting findings on other factors associated with education. Girls have higher school enrollment as well as better educational performance than boys even after other observed variables are controlled. Gender equality in children's education is very important, since it can contribute to gender equality in wage and other social economic activities when the children become adults. Other control variables have expected signs. Older children tend to drop out of school. Urban children, Kinh children, and children whose parents have higher education and income are much more likely to attend school and have better educational records once attending school than rural and ethnic minority children, and children in lower education and income households.

5. Conclusions

In this paper, we used data from the 2006 VHLSSs and probit regressions to estimate the effect of parental disability on education of children age from 6 to 17. Our estimates indicate that disability among parents reduces the school attendance rate of their children around 8.1 percentage points from 81.3 percent to 73.2 percent. The effect tends to be larger for boys, Kinh children, and children in urban areas. We found an especially strong effect of parental disability on children aged from 15 to 17, i.e., upper secondary school age children. However, disability of parents does not have a significant effect on the academic performance of their children in school.

There can be several reasons why children whose parents are disabled are less likely to attend school. First, parental disability can reduce the education as well as income of parents, which then decreases child education. Second, children might have increased responsibilities at home if their disabled parents cannot generate a sufficient livelihood or if they require personal assistance that they cannot access outside the family. Third, children might be reliant on their parents to physically get to school, which disabled parents – e.g., facing transportation barriers – cannot do. Fourth, the increased costs and demands on disabled parents' time might leave them less time and energy to look after their children's education. This fourth reason, however, is not supported by the fact that once they attend school, children of disabled parents have the same level of achievement as their peers.

These findings suggest clear policy implications. To achieve the Millennium Development Goal of universal primary school as well as increased coverage of secondary education, the government should have policies and programs supporting the education of children whose parents have a disability. One approach would be to implement education supports, such as a reduction or exemption of tuition fees and contributions or possibly assistance with transportation. But an approach which gets more directly at the costs of disability would be policies that provide supports to parents (such as rehabilitation) or help build a more inclusive environment so that a parent having a functional limitation imposes less of an imperative for their children to forego their education to address their family's immediate needs.

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Appendix

Table A.1: Variable description

Explanatory variables	Type	Children having parents with disability		Children having parents without disability	
		Mean	Std. Dev.	Mean	Std. Dev.
Gender (male = 1, female = 0)	Binary	0.494	0.500	0.512	0.500
Age	Discrete	13.436	2.910	12.420	3.253
Per capita income (million VND)	Continuous	6.074	5.105	7.163	8.251
Head no degree	Binary	0.359	0.480	0.201	0.401
Head with primary school degree	Binary	0.256	0.437	0.277	0.448
Head with lower-secondary school degree	Binary	0.230	0.421	0.314	0.464
Head with upper-secondary school degree	Binary	0.069	0.254	0.089	0.285
Head with post secondary degree	Binary	0.086	0.281	0.118	0.322
Red River Delta	Binary	0.148	0.356	0.192	0.394
North East	Binary	0.147	0.354	0.117	0.321
North West	Binary	0.021	0.145	0.037	0.188
North Central Coast	Binary	0.120	0.325	0.163	0.369
South Central Coast	Binary	0.074	0.262	0.096	0.294
Central Highlands	Binary	0.127	0.334	0.085	0.280
South East	Binary	0.182	0.386	0.141	0.348
Mekong River Delta	Binary	0.181	0.385	0.170	0.376
Urban (yes = 1)	Binary	0.206	0.405	0.209	0.407
Number of observations		507		8283	

Source: Estimation from the 2006 VHLSS.

Table A.2: First-stage regressions of parental disability

Explanatory variables	Model 1	Model 2	Model 3
Age of father	0.0070***	0.0070***	0.0070***
	(0.001)	(0.001)	(0.001)
Proportion of people with disability at the district	0.4960***	0.5163***	0.5143***
	(0.065)	(0.065)	(0.066)
Gender (male = 1, female = 0)	-0.0046	-0.0052	-0.0050
	(0.005)	(0.005)	(0.005)
Age	-0.0013*	-0.0011	-0.0011
	(0.001)	(0.001)	(0.001)
Ethnic minorities (yeas = 1)	0.0339***	0.0156*	0.0148
	(0.008)	(0.009)	(0.009)
Head no degree	Omitted		
Head with primary school degree		-0.0315***	-0.0310***
		(0.009)	(0.009)
Head with lower-secondary school degree		-0.0501***	-0.0487***
		(0.009)	(0.009)
Head with upper-secondary school degree		-0.0428***	-0.0401***
		(0.012)	(0.012)
Head with post secondary degree		-0.0637***	-0.0602***
		(0.011)	(0.011)
Income per capita (million VND)			-0.0005**
			(0.000)
Red River Delta	Omitted		
North East	0.0234**	0.0224**	0.0225**
	(0.009)	(0.009)	(0.009)
North West	-0.0079	-0.0121	-0.0121
	(0.012)	(0.012)	(0.012)
North Central Coast	-0.0092	-0.0105	-0.0110
	(0.008)	(0.008)	(0.008)
South Central Coast	-0.0006	-0.0104	-0.0101
	(0.009)	(0.009)	(0.009)
Central Highlands	0.0239**	0.0154	0.0155
	(0.011)	(0.011)	(0.011)
South East	0.0211**	0.0066	0.0086
	(0.010)	(0.010)	(0.010)
Mekong River Delta	0.0110	-0.0081	-0.0069
	(0.008)	(0.009)	(0.009)
Urban (urban = 1; rural = 0)	-0.0092	-0.0002	0.0011
	(0.006)	(0.007)	(0.007)
Constant	-0.2679***	-0.2269***	-0.2249***
	(0.021)	(0.022)	(0.022)
Observations	8,788	8,788	8,788
R-squared	0.060	0.066	0.067
Cragg-Donald weak identification test	242.7	243.7	243.2

Robust standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%.
Source: Estimation from the 2006 VHLSS.

Table A.3: Logit regressions of school enrollment

Explanatory variables	Probit regression			Probit with IV regression		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Parental disability (yes = 1, no = 0)	-0.3134***	-0.2253***	-0.2161***	-0.6362*	-0.6583**	-0.7031**
	(0.072)	(0.073)	(0.072)	(0.330)	(0.335)	(0.337)
Gender (male = 1, female = 0)	-0.1470***	-0.1422***	-0.1539***	-0.1321***	-0.1261***	-0.1366***
	(0.038)	(0.039)	(0.039)	(0.036)	(0.037)	(0.037)
Age	-0.1780***	-0.1889***	-0.1931***	-0.1719***	-0.1826***	-0.1868***
	(0.009)	(0.010)	(0.010)	(0.007)	(0.007)	(0.007)
Ethnic minorities (yeas = 1)	-0.5279***	-0.2642***	-0.2102***	-0.4716***	-0.1944***	-0.1343**
	(0.059)	(0.063)	(0.064)	(0.056)	(0.059)	(0.059)
Head no degree	Omitted					
Head with primary school degree		0.3620***	0.3335***		0.3747***	0.3420***
		(0.049)	(0.049)		(0.049)	(0.050)
Head with lower-secondary school degree		0.6810***	0.6187***		0.7083***	0.6443***
		(0.060)	(0.060)		(0.057)	(0.058)
Head with upper-secondary school degree		0.9792***	0.8708***		1.0009***	0.9044***
		(0.107)	(0.109)		(0.095)	(0.096)
Head with post secondary degree		1.2942***	1.1477***		1.3249***	1.1717***
		(0.106)	(0.111)		(0.097)	(0.100)
Income per capita (million VND)			0.0343***			0.0350***
			(0.007)			(0.005)
Red River Delta	Omitted					
North East	0.1957**	0.2431***	0.2261***	0.2118***	0.2565***	0.2409***
	(0.083)	(0.085)	(0.086)	(0.078)	(0.081)	(0.081)
North West	-0.0942	0.0238	0.0200	-0.2234**	-0.0666	-0.0692
	(0.104)	(0.108)	(0.108)	(0.095)	(0.100)	(0.100)
North Central Coast	-0.1597**	-0.1408*	-0.1139	-0.1461**	-0.1212*	-0.0935
	(0.072)	(0.073)	(0.073)	(0.070)	(0.072)	(0.072)
South Central Coast	-0.1356*	0.0913	0.0924	-0.1556**	0.0729	0.0736
	(0.078)	(0.083)	(0.084)	(0.077)	(0.082)	(0.082)
Central Highlands	-0.1934**	-0.0332	-0.0563	-0.1648**	-0.0000	-0.0291
	(0.081)	(0.084)	(0.085)	(0.079)	(0.082)	(0.083)
South East	-0.4465***	-0.1840**	-0.2746***	-0.4816***	-0.1942***	-0.2667***
	(0.072)	(0.078)	(0.081)	(0.070)	(0.074)	(0.075)
Mekong River Delta	-0.6554***	-0.3184***	-0.3741***	-0.6643***	-0.3236***	-0.3763***
	(0.063)	(0.069)	(0.070)	(0.062)	(0.068)	(0.069)
Urban (urban = 1; rural = 0)	0.3121***	0.1241**	0.0699	0.3183***	0.1323**	0.0907
	(0.055)	(0.058)	(0.058)	(0.051)	(0.055)	(0.056)
Constant	3.7922***	3.2912***	3.2095***	3.7158***	3.2029***	3.1189***
	(0.138)	(0.148)	(0.149)	(0.107)	(0.114)	(0.115)
Observations	8,788	8,788	8,788	8,788	8,788	8,788
R-squared	0.166	0.209	0.217			
Wald test of exogeneity (P-value in parentheses)				1.14 (0.28)	1.82 (0.17)	2.27 (0.13)
Test of overidentifying restrictions (P-value in parentheses)				2.96 (0.09)	0.12 (0.73)	0.28 (0.59)

Robust standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%.
Source: Estimation from the 2006 VHLSS.

Table A.4. Probit with instrumental variables regressions including interactions between Parental disability and children's charactersitics

Explanatory variables	Dependent variable is school enrollment (yes = 1)			
Parental disability (yes = 1, no = 0)	8.9437***	0.1884	-1.2452***	-0.6143*
	(2.482)	(0.505)	(0.467)	(0.351)
Parental disability * age	-0.6616***			
	(0.167)			
Parental disability * gender		-1.4416**		
		(0.659)		
Parental disability * ethnic minorities			1.4787**	
			(0.609)	
Parental disability * urban				-0.1886
				(0.942)
Gender (male = 1, female = 0)	-0.1406***	-0.0334	-0.1374***	-0.1320***
	(0.037)	(0.057)	(0.036)	(0.036)
Age	-0.1418***	-0.1726***	-0.1731***	-0.1717***
	(0.010)	(0.007)	(0.007)	(0.007)
Ethnic minorities (yeas = 1)	-0.4935***	-0.4661***	-0.6026***	-0.4725***
	(0.058)	(0.056)	(0.075)	(0.056)
Red River Delta	Omitted			
North East	0.2270***	0.2109***	0.2065***	0.2124***
	(0.080)	(0.078)	(0.078)	(0.078)
North West	-0.1762*	-0.2181**	-0.1696*	-0.2218**
	(0.100)	(0.096)	(0.097)	(0.096)
North Central Coast	-0.1449**	-0.1415**	-0.1490**	-0.1450**
	(0.073)	(0.071)	(0.071)	(0.071)
South Central Coast	-0.1540*	-0.1458*	-0.1617**	-0.1529*
	(0.080)	(0.078)	(0.078)	(0.078)
Central Highlands	-0.1895**	-0.1564**	-0.1547*	-0.1622**
	(0.082)	(0.079)	(0.079)	(0.079)
South East	-0.4860***	-0.4806***	-0.4750***	-0.4802***
	(0.072)	(0.070)	(0.070)	(0.070)
Mekong River Delta	-0.6610***	-0.6563***	-0.6669***	-0.6636***
	(0.065)	(0.063)	(0.063)	(0.062)
Urban (urban = 1; rural = 0)	0.3452***	0.3218***	0.3235***	0.3255***
	(0.053)	(0.051)	(0.052)	(0.079)
Constant	3.3009***	3.6625***	3.7702***	3.7122***
	(0.145)	(0.110)	(0.110)	(0.108)
Observations	8,788	8,788	8,788	8,788

Robust standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%.
Source: Estimation from the 2006 VHLSS

Table A.5. Ordered probit model of educational performance: marginal effect

Explanatory variables	Ordered probit regression			Ordered probit with instrumental variables		
	Prob (Excellent)	Prob (Good)	Prob (Normal, Bad)	Prob (Excellent)	Prob (Good)	Prob (Normal, Bad)
Parental disability (yes=1,no=0)	0.0019	0.0020	-0.0039	0.0024	0.0026	-0.0050
	(0.0128)	(0.0131)	(0.0259)	(0.0665)	(0.0698)	(0.1363)
Gender (male = 1, female = 0)	-0.0662***	-0.0685***	0.1347***	-0.0662***	-0.0685***	0.1347***
	(0.0058)	(0.0062)	(0.0115)	(0.0058)	(0.0062)	(0.0116)
Age	-0.0118***	-0.0124***	0.0241***	-0.0118***	-0.0124***	0.0241***
	(0.0010)	(0.0011)	(0.0020)	(0.0010)	(0.0011)	(0.0021)
Ethnic minorities (yeas = 1)	-0.1044***	-0.1750***	0.2795***	-0.1044***	-0.1751***	0.2795***
	(0.0056)	(0.0137)	(0.0181)	(0.0057)	(0.0140)	(0.0186)
Red River Delta	Omitted					
North East	-0.0168*	-0.0191*	0.0359*	-0.0168*	-0.0191*	0.0359*
	(0.0093)	(0.0113)	(0.0206)	(0.0093)	(0.0113)	(0.0206)
North West	-0.0492***	-0.0699***	0.1191***	-0.0492***	-0.0699***	0.1191***
	(0.0125)	(0.0236)	(0.0360)	(0.0126)	(0.0237)	(0.0363)
North Central Coast	-0.0514***	-0.0671***	0.1185***	-0.0514***	-0.0671***	0.1185***
	(0.0074)	(0.0120)	(0.0192)	(0.0074)	(0.0120)	(0.0192)
South Central Coast	-0.0259***	-0.0310**	0.0568**	-0.0259***	-0.0310**	0.0569**
	(0.0094)	(0.0128)	(0.0221)	(0.0094)	(0.0128)	(0.0222)
Central Highlands	-0.0596***	-0.0864***	0.1460***	-0.0596***	-0.0864***	0.1460***
	(0.0078)	(0.0151)	(0.0226)	(0.0078)	(0.0151)	(0.0227)
South East	-0.0080	-0.0087	0.0168	-0.0081	-0.0088	0.0168
	(0.0099)	(0.0112)	(0.0212)	(0.0100)	(0.0113)	(0.0213)
Mekong River Delta	-0.0206**	-0.0236**	0.0442**	-0.0206**	-0.0236**	0.0442**
	(0.0086)	(0.0108)	(0.0194)	(0.0086)	(0.0108)	(0.0194)
Urban (yes = 1)	0.1163***	0.0815***	-0.1978***	0.1163***	0.0815***	-0.1978***
	(0.0097)	(0.0049)	(0.0135)	(0.0097)	(0.0049)	(0.0135)
Observations	7,257			7,257		

Note: the coefficients present the probability of different categories of academic record.
Robust standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%.
Source: Estimation from the 2006 VHLSS